

What I Claim Is:

1. A fuel injector comprising:

 a housing having a passageway extending between an inlet and an outlet along a longitudinal axis, the housing including a body proximate the outlet;

 an armature assembly disposed in the body, the armature assembly having a closure member; and

 a seat assembly disposed in the body, the seat assembly including:

 a flow portion, the flow portion extending along the longitudinal axis between a first surface and an orifice disk retention surface at a first length, the flow portion having a seat orifice extending therethrough;

 an orifice disk coupled to the orifice disk retention surface so that the orifice plate is aligned in a fixed spatial axial orientation with respect to the flow portion;

 and

 a securement portion, the securement portion extending along the longitudinal axis away from the orifice disk retention surface at a second length greater than the first length.

2. The fuel injector of claim 1, further comprising at least one weld extending from an outer surface of the body to the surface of the securement portion at a location distal to the flow portion so that the seat and the orifice disk generally maintains its fixed spatial axial orientation with the flow portion.

3. The fuel injector of claim 1, further comprising at least one weld extending from an outer surface of the body to the surface of the securement portion at a location distal to the flow portion so as to form a generally hermetic seal between the body and the seat.

4. The fuel injector of claim 1, further comprising at least one weld extending from an outer surface of the body to the surface of the securement portion at a location distal to the flow portion so that the seat maintains a dimensional symmetry about the longitudinal axis.
5. The fuel injector of claim 1, wherein the at least one weld is located on the outer surface of the body at a length of approximately 50% of the second length along the longitudinal axis.
6. The fuel injector of claim 5, wherein the housing comprises:
 - an inlet tube having a first end and a second end being coupled to a body, the second end of the inlet tube having an end portion confronting an end portion of the armature;
 - a filter being disposed proximate the first end of the inlet tube;
 - a resilient member having one portion disposed proximate the second end of the inlet tube and another portion disposed within a pocket in the armature;
 - an adjusting tube being located within the inlet tube, the adjusting tube engaging the one portion of the resilient member so as to bias the closure member towards a position occluding flow through the seat orifice.
7. The fuel injector of claim 6, wherein the armature assembly comprises an armature coupled to a needle.
8. The fuel injector of claim 7, wherein the needle comprises an end being generally hemispheric about the longitudinal axis.
9. The fuel injector of claim 8, further comprising a pole piece, and wherein the inlet tube and the pole piece comprises a one-piece member.
10. The fuel injector of claim 9, wherein the flow portion comprises:
 - first and second spaced apart generally planar surfaces disposed about the longitudinal axis, the first and second spaced apart generally planar surfaces; and

a sealing surface co-terminus with one of the first and second spaced apart generally planar surfaces and contiguous to the seat orifice.

11. The fuel injector of claim 10, wherein the securement portion comprises:

a perimeter cincturing the flow portion and extending along the longitudinal axis between a first perimeter end and a second perimeter end over a third length greater than the second length.

12. The fuel injector of claim 11, wherein seat further comprises a guide member contiguous to the first perimeter end of the seat, the guide member being provided with a central through opening along the longitudinal axis and a plurality of through openings disposed about the central opening, the central through opening guiding the closure member along the longitudinal axis between the first position where the closure member occludes fuel flow through the seat orifice and the second position where the closure member is spaced from the seat orifice so as to permit fuel flow through the seat orifice.

13. The fuel injector of claim 12, wherein the seat further comprises an orifice disk connected to the second surface of the seat, the orifice disk having a plurality of through openings being disposed about the longitudinal axis and in fluid communication with the seat orifice.

14. The fuel injector of claim 13, wherein the armature comprises at least one opening generally oblique to the longitudinal axis and extending through the surface of the armature.

15. The fuel injector of claim 14, wherein the armature comprises an inner surface telescoping over an outer surface of the closure member.

16. A method of maintaining a fixed spatial axial orientation of a seat and an orifice disk in a body, the body extending along a longitudinal axis, the method comprising:

disposing the seat and the orifice disk in the body at a fixed spatial axial orientation; and

welding the seat to the body so that the fixed spatial axial orientation is maintained within a tolerance of $\pm 0.5\%$.

17. The method of claim 16, wherein the welding comprises laser welding through from an outer surface of the body to the surface of the securement portion at a location distal to the flow portion so that the symmetry of each of the seat and the orifice disk about the longitudinal axis is within a magnitude of about less than $\pm 1\%$ in the difference between any dimensional change of the seat about the longitudinal axis.

18. The method of claim 17, wherein the laser welding comprises forming a continuous weld about the longitudinal axis on a securement portion of the seat at about 50% of the length of a flow portion of the seat along the longitudinal axis.

19. The method of claim 17, wherein the laser welding comprises forming a hermetic lap weld between the inner surface of the body and the circumferential surface of the securement portion.

20. The method of claim 16, wherein the disposing of the seat comprises:

forming the flow portion having first and second spaced apart generally planar surfaces over a first length, the flow portion having a sealing surface co-terminus with one of the first and second spaced apart generally planar surfaces and contiguous to the seat orifice, and a orifice disk retention surface contiguous with the seat orifice on the other of the first and second generally planar surface; and

welding an orifice disk to the orifice disk retention surface in the fixed spatial axial orientation of the orifice disk relative to the orifice disk retention surface.

21. The method of claim 20, wherein the providing comprises:

forming a perimeter defining the securement portion, the perimeter cincturing the flow portion and extending along the longitudinal axis between a first perimeter end and a second perimeter end over a second length greater than the first length;

connecting a generally planar closure guide member to the first perimeter end of the seat so as to form a seat assembly; and

press-fitting the seat assembly in the body to a predetermined distance within the body.